THE PREDICTION OF SUCCESS IN SELECTED AREAS AT THE DES MOINES AREA COMMUNITY COLLEGE

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by

James Franklin Dowis

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James Franklin Dowis

Approved by Committee:

Howard W. Troplar
Chairman

Stuart C. Tiedtke

ASSOCIATE Dean of the School of Graduate Studies

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CHAPTER I

INTRODUCTION

When it becomes time to choose a career, many individuals have no idea which career to select. Their indecision is due, at least in part, to two main factors: (1) an ever changing society in which new careers are created each year (for example, The World Almanac states that in the 1970's there will be 100,000 new computer programmer type jobs, 270,000 new draftsman type jobs, and 580,000 new auto mechanic type jobs),[1] and (2) a wide variety of requirements that are associated with the new careers. Especially important are the questions concerning necessary training, qualifications, and the possibilities for success in each of the respective careers the student might choose.

As the various factors governing career choices become greater, the job of the counselor becomes more and more complex. The counselor must be able to help his counselee:

1. Select a career in which he could find satisfaction.
2. Find what might be his chances for success in a chosen career.
3. Reduce the waste of time and money spent pursuing the wrong career.

Obviously, the individual must be considered in choosing a career;

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[1]Newspaper Enterprise Association, Inc., The World Almanac and Book of Fact - 1970 Edition (New York: Doubleday and Co., Inc.), p. 42.

therefore, the counselor must gather information concerning the individual's interest, aspirations, aptitudes, financial ability, educational record, past achievements, and maturity level. This information may be gathered by the counselor during counseling interviews, through the use of interest, aptitude and achievement tests, or from other referring agencies such as the Work Incentive Program or the Iowa Employment Security Commission.

Since its very beginning, the Des Moines Area Community College has worked closely with the Iowa Employment Security Commission and with its related agency the Iowa State Employment Service in the selection and acceptance of students into the various programs offered at the college. Since the Employment Service had used the General Aptitude Test Battery (informally known as the GATB) for many years with much success, the college decided that it too could use this test as part of its selection procedures.

The college in its first classes used the cut off score guidelines suggested by the GATB Manual[1] in accepting students into the various program areas, such as the five included in this study. It should also be pointed out that at this time the cut off scores are not

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[1]United States Department of Labor, Manual for General Aptitude Test Battery, Section II Norms, Occupational Aptitude Pattern Structure, and Section IV Norms, Specific Occupations, (Washington, D. C., 1966).

absolute and that the arithmatic means of past students scores are also used as guidelines.

Still another variable, pointed out by the admissions counselors at Des Moines Area Community College, is that in some cases where a student's desires exceed his measured aptitude (as shown by the GATB sub tests), conferences with the student, a school counselor, and at least one curriculum area instructor are used to help determine final acceptance or rejection.

It is during these conferences that the previously mentioned factors are more thoroughly explored with the student. (The cut off score guidelines that are used with the programs considered in this study will be indicated in the appropriate section.) If it is decided to reject a student's application for a particular program, the counselor then tries to help the student select a program in which he could find success and satisfaction. For example, a student applying for the computer programmer course might be rejected due to low test results and other considered factors. However, the student may then decide, with the counselors help, to select the shorter and less complex computer operator course which might better fit the student's abilities and aptitudes.

Since it has been pointed out that selection of a particular program by a student is a many faceted problem, how then can the counselor

help his counselee make the right choice? In addition to personal data on each student (age, sex and marital status), it is the intent of this study to explore the parts of but one of the tools used by the counselors at the Des Moines Area Community College: The General Aptitude Test Battery.

I. THE PROBLEM

Statement of the problem. The purpose of this study is to determine the effectiveness of seven variables: student's sex, age, marital status, the G (General Intelligence), V (Verbal Ability), N (Numerical Reasoning), and S (Spatial Relations) scores on the General Aptitude Test Battery in predicting success in training for five separate curriculum areas. Success will be measured by the students' subsequent graduation and cumulative grade-point-averages at the Des Moines Area Community College. The five curriculum areas are: Dental Assistants, Auto Mechanics, Drafting, Data Processing, and Industrial Electronics.

Importance of the study. Just what educational opportunities are open to an individual has always been a problem. For the high school graduate, the choices were usually: secure a job (for which he may have taken no specific training while in high school), enter the military service, continue education at a college or university, attend one of the several private trade or vocational schools, or any combination

of these. The legislature of the State of Iowa realized that this state needed to provide higher education facilities and programs for its people. Therefore, the legislature authorized the establishment of a state-wide system of public comprehensive community colleges. As a result, the Des Moines Area Community College was established in March of 1966. The school started with twenty-eight students in five programs. From this small beginning, the college has grown to include 40 different programs and 1400 full-time day students.[1]

The many programs that the school now has to offer, coupled with the tremendous variety in the backgrounds of the people who apply for these different programs, places a heavy responsibility upon the counselors. For example, some of the people who apply for the vocational technical programs do not have a high school diploma. Through the adult education programs and with the help of the counselors many students qualify for and receive a high school diploma upon graduation. It is hoped that this study will indicate which, if any, of the studied factors might prove helpful to the counselors in guiding the students to a program area in which they can find satisfaction and success.

Limitations of the study. One of the first limitations is the

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[1]Des Moines Area Community College, Status Study (Ankeny, Iowa, April, 1970), p. 4.

small size of the groups being studied. Since the young college has graduated few students and since only graduates of the various programs were included in the study, only a small amount of data could be accumulated. The number of students studied in each program were: Dental Assistants - 32, Auto Mechanics - 40, Drafting - 26, Data Processing - 36, and Industrial Electronics - 28. Because of the small sample, there is a greater danger of drawing incorrect conclusions than if the sample were larger. Roscoe suggests that sample sizes of 30 or less are to be avoided.[1]

Another limitation is in the tests themselves, Goldman states, "Every user of tests can report, from his own observations and from testimonials of his subjects or counselees that there is a considerable amount of anxiety and tension associated with taking tests."[2] Whether the anxiety and tension is good or bad depends on the individual. In any event, the way the student feels about taking tests could affect the scores one way or the other. Blanchard points out some other conditions that could affect tests scores: poor eyes, the physical environment, an injured hand, unhappy experience in the school situation, and other work

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[1]John T. Roscoe, Fundamental Research Statistics for the Behavioral Sciences (New York: Holt Rinehart, and Winston, Inc., 1969), p. 156.

[2]Leo Goldman, Using Tests in Counseling (New York: Appleton-Century-Crofts, Inc., 1961), p. 108.

habits (the slow, methodical worker is penalized on the timed tests).[1] Anastasi contends that the three greatest limitations of tests are motivation, test anxiety, and rapport, or lack of it, between the testor and the testee.[2]

A third limitation is the using of grade point averages as a dependent variable in the study because the staff and curriculum has changed and developed almost constantly since the school first opened. For instance, during this writer's 2 3/4 years employment by the Des Moines Area Community College, there have been many changes in curriculum even within the same class taught by the same instructor. Other instructors on the faculty confirm that curriculum changes are common place. It should be noted that in direct job-entry training, such as that found in the vocational-technical areas, changes are necessary to keep the curriculum up-to-date. The curriculum changes and the addition of newer and better textbooks, equipment, and related teaching materials could, either separately or jointly, cause some affect on individual course grades and, therefore, on cumulative grade-point-averages.

A fourth limitation that would affect the grade point averages

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[1]Howard L. Blanchard and Laurence S. Flaum, Guidance: A Longitudinal Approach (Minneapolis: Burgess Publishing Co., 1968), p. 123.

[2]Anne Anastasi, Psychological Testing (New York: The Macmillan Company, 1962), p. 48-54.

could be attributed to the turn-over in staff. Though this has been surprisingly low at the college, it would nonetheless be a factor. Identical courses taught by different instructors to equal ability classes could result in a wide variance in grades.

And lastly, a fifth limitation that would affect the study's validity is the definition of success. Success, as defined, is the completion of courses and the reception of a certificate. This definition, of course, ignores the student who terminates a quarter or so early, gets a job in the area for which he was trained, and so far as can be ascertained, succeeds at his job. Wasn't he also successful in training for his particular area? Perhaps that person should be included in a later study. It is this writer's opinion that the results of this study that will be described in the following chapters should be considered in the light of the aforementioned limitations.

CHAPTER II

REVIEW OF LITERATURE

There are many studies which are concerned with the prediction of success in training from scores obtained on the General Aptitude Test Battery. However, studies that are concerned with the community college student and particularly with the vocational-technical students in the community college are extremely limited. This is probably due in part to the relative newness of vocational-technical programs in the community college environment.

The General Aptitude Test Battery was first introduced by the United States Employment Service in 1947. Since that time the GATB has been included in a continuing program of research to validate the tests against success in many different occupations. Because of its extensive research base, the GATB has come to be recognized as the best validated multiple aptitude test battery in existence for use in vocational guidance.[1]

A great deal of research has been done using the GATB at both the high school and college-university levels. These studies have (in most cases) found a relatively high correlation between the GATB scores

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[1]United States Department of Labor, Manual for the General Aptitude Test Battery, Section II: Norms, Occupational Aptitude Pattern Structure (Washington, D.C.: 1966), Foreward.

and grade point averages. Some major schools that have contributed to these studies have been the University of Utah (1948),[1] the University of Florida (1952),[2] Utah State University (1959),[3] and the Ohio secondary schools (1966).[4]

The United States Employment Service is also constantly researching its own test. Stephen Bemis reported on a random 20% sample of 345 studies conducted by the USES in 1600 of its local offices. The results are shown in Table I.[5]

TABLE I

MEDIAN VALIDITIES OF GATB APTITUDES

Type of Criterian	No. of Studies	G	V	N	S	P	Q	K	F	M
Job Proficiency	64-70	.25	.19	.21	.17	.23	.20	.23	.22	.23
Training	67-71	.39	.30	.31	.25	.22	.22	.14	.16	.14

[1]GATB Project Staff, "GATB Patterns for College Areas," Occupations, Vol. 29 (April, 1951), pp. 137-144.

[2]Sibyll Story, "Evaluative Data on the GATB," Personnel and Guidance Journal, Vol. 28 (Nov., 1952), pp. 87-88.

[3]H. C. Shorp, "GATB Scores as Predictors of Success in College," Educational and Psychological Measurement, Vol. 19 (Winter, 1959), pp. 617-623.

[4]Ralph W. Ingersoll and Herman J. Peters, "Predictive Indices of the GATB," Personnel and Guidance Journal, XLIV (May, 1966), pp. 931-937.

[5]Stephen E. Bemis, "Occupational Validity of the General Aptitude Test Battery," Journal of Applied Psychology L II (June, 1968), pp. 240-244.

Bemis went on to point out, as can be seen from the table, that the cognitive values G, V, N, S are more useful for predicting training criteria than for predicting job proficiency criteria. He also noted that the manipulative aptitudes (K,F,M) are more useful for predicting job proficiency criteria.[1]

A study using students at the Manpower and Development Training Center in Ottumwa, Iowa was conducted by Donald Palmer in 1966. His study was closely related to this writer's; however, it was limited to business programming students in a four quarter course. The product-moment correlations between the independent variables of the sub-test on the GATB (G - Intelligence Aptitude, V - Verbal Aptitude, N - Numerical Aptitude, S - Spatial Aptitude), Age, PAT (Programmers Aptitude Test), and the dependent variable of cumulative grade-point-average are shown in Table II.

Palmer also performed a multiple regression analysis and discovered that the only predictors to remain were the PAT and the GATB-N scores. The GATB-N score was not significant at the .05 level. The following was found:

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[1] Ibid., p. 241.

TABLE II

PRODUCT MOMENT CORRELATION BETWEEN INDEPENDENT VARIABLE AND DEPENDENT VARIABLE

Independent Variable	N	V	Significance Level
Age	77	-0.0038	
G	76	0.3737	.01
V	76	0.2844	.02
N	76	0.4735	.01
S	75	-0.0236	
PAT	60	0.5257	.01[9]

Independent Variables	I- Ratio
PAT GATB-N	6.2917 (F(.05)-4.02)[1]

The most recent other relevant study this author could find was done in 1969 by Robert E. Eberley of the University of Missouri. For his subjects he used 203 college transfer freshmen and 88 vocational-technical students from Monatee Junior College at Bradenton, Florida.

Eberley correlated the means of the GATB subtests against the cumulative grade-point-averages of both the transfer and vocational-technical students. His results are shown in Table III.[2]

Eberley pointed out that from his results the certain aptitudes from the complete battery are fair predictors of academic success, but are less successful for vocational-technical prediction. He further stated that he had lumped together all vocational-technical areas so that they had a tendency to cancel each other. Some areas, as will be shown in this writer's study, have high prediction; while other areas have very low prediction. He suggested that in future studies the vocational-technical areas should be kept separate so that more accurate conclusions could be drawn.[3]

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[1]Donald C. Palmer, "The Prediction of Success in Training for Business Programming Students," (unpublished Master's field report, Drake University, 1966), p. 31.

[2]Robert E. Eberley, "The General Aptitude Test Battery as a Predictor of Junior College Achievement," (University of Missouri, 1969), pp. 1-10. Unpublished report.

[3]Ibid., p. 9.

TABLE III

MEANS (M), STANDARD DEVIATIONS (SD) AND VALIDITY (CORRELATION) COEFFICIENTS (r) OF GATB (AT .01 LEVEL)

Aptitude	Transfer Students N=203			Vocational-Technical Students N=88			ALL		
	M	SD	r	M	SD	r	M	SD	r
G	117.7	12.90	.45	112.74	11.75	.28	115.83	12.70	.40
V	112.64	13.72	.46	108.89	11.61	.27	111.50	13.21	.41
N	115.16	14.23	.38	111.42	12.25	.30	114.03	13.75	.35
S	115.15	18.61	.17	112.49	17.59	.19	114.32	18.31	.17
P	118.38	18.68	.23	119.86	19.66	.27	118.83	18.96	.24
Q	119.32	15.30	.41	119.80	13.96	.35	119.46	14.89	.40
K	112.35	16.98	.21	112.67	15.73	.01	112.45	16.59	.16
F	100.88	20.23	.16	103.19	22.13	.13	101.58	20.82	.15
M	101.80	20.19	-.04	104.38	19.84	-.05	102.58	20.08	-.04

CHAPTER III

DESCRIPTION OF RESEARCH PROCEDURE

I. SAMPLE AND POPULATION

The subjects that were selected for this study were graduates of five curriculum areas at the Des Moines Area Community College in Ankeny, Iowa. The five curriculum areas, the number of graduates, and the length of each area in quarters are:

Course Name	No. of Graduates	Length of Course (quarters)
Dental Assistants	32	4
Auto Mechanics	40	7
Drafting	26	4
Data Processing	36	7
Industrial Electronics	28	7

Their educational backgrounds prior to entering the above mentioned programs varied from a 10th grade high school education to one year of college.

II. TESTING INSTRUMENT USED

The instrument that was considered in this study is the one that is used to provide entry criterion for all the vocational-technical programs at the college -- the General Aptitude Test Battery (GATB). The individual students' scores were obtained by the college counseling staff mainly in two ways: (1) by administering the test when the student made

application, or by (2) using scores obtained from the referring agency, e.g., the Iowa State Employment Service.

For the programs studied in this report, the GATB means, standard deviations, and cut-off guidelines presently used by the counselors are shown in Table IV.

The GATB consists of nine separate subtests. Often some of the subtests may be omitted. The subtests selected for this study were: G-General Intelligence, V-Verbal Aptitude, N-Numerical Reasoning, and S-Spatial Relations. These subtests were given to all students. Also included in the study, especially for the purposes of the correlation computations, were the student's age, sex and marital status (marital status was either single (divorced, widowed) or married. The student's cumulative grade point averages were used as the dependent variable.

III. METHODS AND PROCEDURES

Though the curriculum areas themselves will be considered separately, the procedures used for each area were the same. The following steps were performed:

1. The data was compiled from the college's student personnel records and was coded and punched into Hollerith-coded (IBM) cards.
2. The cards were then verified on the card verifier to ensure correctness of data.

TABLE IV

GATB MEAN, STANDARD DEVIATION, AND GUIDELINE MEANS BY PROGRAM

Program		G	V	N	S
Dental Assistants	Mean	109.81	109.22	107.75	109.75
	SD	14.41	11.10	14.10	14.66
	Guidelines	102	103	105	112
Auto Mechanics	Mean	104.28	99.15	101.03	113.20
	SD	13.41	9.03	12.06	20.15
	Guidelines	106	99	102	117
Drafting	Mean	114.27	104.92	111.73	122.81
	SD	12.14	9.26	11.96	15.21
	Guidelines	108	97	101	127
Data Processing	Mean	115.42	107.61	115.22	116.00
	SD	10.65	10.75	11.81	14.61
	Guidelines	117	107	118	120
Industrial Electronics	Mean	117.36	108.21	112.54	124.14
	SD	9.41	10.45	9.87	10.69
	Guidelines	114	104	110	121

3. Then the cards were processed on the college's IBM 360 Model 30 computer performing the correlation coefficient computations.
4. After the correlation coefficient runs, the sex and marital status variables were removed for the regression analysis runs.
5. Then an initial regression analysis run was performed in which the independent variables of students' age and GATB/G, V, N, and S scores were considered with the dependent variable of the student's cumulative-grade-point-averages.
6. After the initial regression analysis run, a single elimination method and additional regression analysis runs eliminated the non-significant variables (if the initial run indicated the existence of significance).

For the purpose of statistical inference the following null hypotheses were postulated:

1. There is no significant value in using the student's age as a predictor of success.
2. There is no significant value in using the student's GATB G score as a predictor of success.
3. There is no significant value in using the student's GATB V score as a predictor of success.
4. There is no significant value in using the student's GATB N score as a predictor of success.

5. There is no significant value in using the student's GATB S score as a predictor of success.

CHAPTER IV

FINDINGS AND DISCUSSION

I. DENTAL ASSISTANTS

The figures in Table V list all possible product-moment correlations between the variables in the study.

The figures in Table VI show the product-moment correlation between the independent variables and the one dependent variable-cumulative grade-point-averages. It is interesting to note the high correlations of the G and N scores. The .000 correlation for sex was caused by there being only women in this program.

The results of the regression analysis run are shown by the figures in Table VII. The only variable that proved significant (at the .05 level) was the N (Numerical Aptitude) score. For the purposes of this study, only the previously stated null hypothesis (4) concerning the N score was invalid. All other null hypotheses stating that there is no significant value in using the students' age or GATB G, V, or S scores as a predictor of success (grade-point-average) were valid.

TABLE V

DENTAL ASSISTANTS

ALL POSSIBLE PEARSON PRODUCT-MOMENT CORRELATIONS (r)
BETWEEN VARIABLES IN THIS STUDY

	2	3	4	5	6	7	8
1. Sex*	.000	.000	.000	.000	.000	.000	.000r
2. Age		-.125	.105	.176	.094	-.179	.250r
3. Marital Status			.165	.076	.115	.330	.320r
4. G				.641	.922	.572	.584r
5. V					.558	.061	.391r
6. N						.400	.601r
7. S							.252r
8. Cum. G.P.A.							

*All Women

TABLE VI

PRODUCT MOMENT CORRELATIONS (r) BETWEEN INDEPENDENT VARIABLES AND DEPENDENT VARIABLES

Independent Variable	r
Sex	.0000
Age	.2496
Marital Status	.3195
G	.5844
V	.3905
N	.6012
S	.2518

TABLE VII

DENTAL ASSISTANTS

SIGNIFICANT VARIABLES, INITIAL F, BETA, AND FINAL F

Independent Variable	Initial F	Beta	Final F
N	3.54(.05)	.490	5.48 (.05)
R^2=.365	Initial Tabled Value F (.05) = 2.59		
	(.01) = 3.82		
	Final Tabled Value F (.05) = 4.22		
	(.01) = 7.72		

II. AUTO MECHANICS

The figures given in Table VIII list all possible product-moment correlations between the variables in the study.

The figures given in Table IX show the product-moment correlations between the independent variables and the dependent variable--cumulative grade-point-averages. The .000 correlation for sex illustrated that there were only men in this program.

The results of the regression analysis run are shown by the figures in Table X.

Using the single elimination method, only the N score variable was deleted.

Significance was found at the .01 level, but after the elimination process, the significance was closer to the .05 level. For the purposes of this study, only the previously stated null hypothesis (4) concerning the N score was valid. All other null hypothesis stating that there is no significant value in using students' age and GATB G, V, or S as a predictor of success (grade-point-average) were invalid.

TABLE VIII

AUTO MECHANICS

ALL POSSIBLE PEARSON PRODUCT-MOMENT CORRELATIONS (r)
BETWEEN VARIABLES IN THIS STUDY

	2	3	4	5	6	7	8
1. Sex*	.000	.000	.000	.000	.000	.000	.000r
2. Age		.596	.039	.145	-.130	-.259	.342r
3. Marital Status			.096	.195	.075	-.105	.345r
4. G				.606	.804	.694	.344r
5. V					.410	.226	.433r
6. N						.377	.170r
7. S							.315r
8. Cum. GPA							

*All Men

TABLE IX

AUTO MECHANICS

PRODUCT MOMENT CORRELATIONS (r) BETWEEN INDEPENDENT VARIABLES AND DEPENDENT VARIABLES

Independent Variable	r
Sex	.000
Age	.341
Marital Status	.345
G	.344
V	.433
N	.170
S	.315

TABLE X

AUTO MECHANICS

SIGNIFICANT VARIABLES, INITIAL F, BETA, AND FINAL F

Independent Variable	Initial F	Beta	Final F
Age	4.454(.01)	.399*	5.994(.05)
G		-.209*	
V		.394*	
S		.474*	

Initial Tabled Value F (.05) = 2.49

(.01) = 3.61

R^2 = .384

Final Tabled Value F (.05) = 4.13

(.01) = 7.44

*Significance at .05

III. DRAFTING

The figures in Table XI show all the possible product-moment correlations between the variables in the study.

The product-moment correlations between the independent variables and the dependent variable -- cumulative grade-point-averages are shown by the figures in Table XII.

The figures in Table XIII show the results of the regression analysis runs. The only non significant variable according to this study was age. It should be noted here that there was initial significance at the .01 level, and even after the deletion the significance remained at the .01 level. For the purposes of this study, only the previously stated null hypothesis (1) concerning the students' age was valid. All other null hypotheses stating that there is no significant value in using the student scores on the GATB G, V, N, and S as predictors of success (grade-point-average) were invalid.

TABLE XI

DRAFTING

ALL POSSIBLE PEARSON PRODUCT-MOMENT CORRELATIONS (r) BETWEEN VARIABLES IN THIS STUDY

	2	3	4	5	6	7	8
1. Sex	.518	-.123	.196	.439	.188	.023	.181r
2. Age		.221	.029	.123	.035	-.069	-.032r
3. Marital Status			-.247	-.273	-.222	-.233	.458r
4. G				.746	.812	.716	.373r
5. V					.487	.371	.385r
6. N						.391	.334r
7. S							.481r
8. Cum. G.P.A.							

TABLE XII

DRAFTING

PRODUCT MOMENT CORRELATIONS (r) BETWEEN INDEPENDENT VARIABLES AND DEPENDENT VARIABLES

Independent Variable	r
Sex	.181
Age	.032
Marital Status	.458
G	.373
V	.385
N	.334
S	.481

TABLE XIII

DRAFTING

SIGNIFICANT VARIABLES, INITIAL F, BETAS, AND FINAL F

Independent Variable	Initial F	Beta	Final F
G	4.65	-2.123*	9.63
V		.982*	
N		1.110*	
S		1.204*	
		Initial Tabled Values F (.05) = 2.71	
R^2 = .535		(.01) = 4.10	
		Final Tabled Values F (.05) = 4.35	
		(.01) = 8.10	

*Significance at .01

IV. DATA PROCESSING

The figures in Table XIV indicate all the possible product-moment correlations between the variables in the study.

The product-moment correlations between the independent variables and the dependent variable cumulative grade-point-averages are presented by the figures in Table XV.

The results of the regression analysis runs, are shown by the figures in Table XVI. Since no significance was found on the initial regression run, none of the variables collectively or after the single elimination process would show significance. For the purposes of this study, all the null hypotheses which state that there is no significant value in using the students' age or GATB - G, V, N, and S as predictors of success (grade-point-average) were valid.

TABLE XIV

DATA PROCESSING

ALL POSSIBLE PEARSON PRODUCT-MOMENT CORRELATIONS (r)
BETWEEN VARIABLES IN THIS STUDY

	2	3	4	5	6	7	8
1. Sex	.232	-.158	-.315	.207	.208	-.367	.153r
2. Age		.214	-.047	.161	-.129	-.069	.294r
3. Marital Status			-.067	-.079	-.036	-.092	.181r
4. G				.573	.675	.747	.378r
5. V					.279	.201	.345r
6. N						.352	.288r
7. S							.135r
8. Cum. G.P.A.							

TABLE XV

DATA PROCESSING

PRODUCT MOMENT CORRELATIONS (r) BETWEEN INDEPENDENT VARIABLES AND DEPENDENT VARIABLE

Independent Variable	r
Sex	.151
Age	.295
Marital Status	.181
G	.378
V	.345
N	.288
S	.135

TABLE XVI

DATA PROCESSING

INDEPENDENT VARIABLES, INITIAL F AND INITIAL BETAS

Independent Variables	Initial F	Betas
Age	2.37	.304*
G		.578*
V		.013*
N		.035*
S		.091*
R^2 = .283	Initial Tabled Values F	(.05) = 2.53
		(.01) = 3.70

*Significant at .05

V. INDUSTRIAL ELECTRONICS

The figures in Table XVII show all possible product-moment correlations between the variables in the study.

The product-moment correlation between the independent variables and the dependent variable cumulative grade-point-averages are presented by the figures in Table XVIII.

The .0000 correlation for the sex variable was caused by there being only men in this program.

The results of the regression analysis runs are shown by the figures in Table XIX. Since no significance was found on the initial regression run, none of the variables collectively or after the single elimination process could show significance.

For the purpose of this study all the null hypotheses stating that there is no significant value in using the students' age or GATB - G, V, N, and S as predictors of success (grade-point-average) were valid.

TABLE XVII

INDUSTRIAL ELECTRONICS

ALL POSSIBLE PEARSON PRODUCT-MOMENT CORRELATIONS (r) BETWEEN VARIABLES IN THIS STUDY

	2	3	4	5	6	7	8
1. Sex*	.000	.000	.000	.000	.000	.000	.000
2. Age		.713	.326	.451	.302	.182	.471
3. Marital Status			.067	.192	.095	.011	.262
4. G				.670	.760	.151	.407
5. V					.364	.005	.363
6. N						-.158	.431
7. S							.154
8. Cum. G.P.A.							

*All Men

TABLE XVIII

INDUSTRIAL ELECTRONICS

PRODUCT-MOMENT CORRELATIONS (r) BETWEEN INDEPENDENT VARIABLES AND DEPENDENT VARIABLE

Independent Variable	r
Sex	.000
Age	.471
Marital Status	.262
G	.407
V	.363
N	.431
S	.154

TABLE XIX

INDUSTRIAL ELECTRONICS

INDEPENDENT VARIABLES, INITIAL F AND INITIAL BETAS

Independent Variables	Initial F	Betas
Age	2.36	.266*
G		.199*
V		.207*
N		.459*
S		.208*
	Initial Tabled Values F	(.05) = 2.66
		(.01) = 3.99

*Significance at .05

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

It was the purpose of this study to determine the effectiveness of eight variables: the G (General Intelligence), V (Verbal Aptitude), N (Numerical Reasoning), and S (Spatial Relations) scores on the General Aptitude Test Battery; and the students' age, sex, and marital status in predicting success in training for selected areas at the Des Moines Area Community College at Ankeny, Iowa.

The subjects used in this study were graduates of five vocational-technical curriculum areas at the community college. The five areas and the number of their graduates were: Dental Assistants -- 32, Auto Mechanics -- 40, Drafting -- 26, Data Processing -- 36, and Industrial Electronics -- 28. Prior to acceptance into the different programs, all the students were required to take the General Aptitude Test Battery.

To determine whether the above mentioned variables are effective criteria for predicting success in training for the five selected areas, the eight variables were correlated against the criterion grade-point-average. A multiple regression analysis was also run on the computer after omitting the sex and marital status from the data. Sex and marital status are discreet variables, so they were not included in the regression analysis runs.

For the dental assistants students, the only variable that remained from the regression analysis was the N (Numerical Aptitude) score

with a final F of 5.48 at the .05 level.

For the auto mechanics students, the age, G, V, and S scores remained with a final F of 5.99 at the .05 level.

For the drafting students, the G, V, N, and S scores remained from the regression analysis witha final F of 9.63 at the .01 level. None of the independent variables remained after the regression runs for either the data processing or the industrial electronics programs.

I. CONCLUSIONS

Based upon the results of this study, the writer concludes that for these samples:

1. GATB - N (Numerical Aptitude) was the only variable that had significant predictive value for the dental assistant program.
2. GATB - N (Numerical Aptitude) was the only variable that did not have significant predictive value, but age, GATB - G, V, and S variables had predictive value for the auto mechanics program.
3. For the drafting program, the only variable that did not have significant predictive value in this study was age. The GATB - G, V, N, and S scores were all significant variables.
4. Of the five programs included in this report, i.e., dental assistants, auto mechanics, drafting, data processing, and

industrial electronics, the GATB subtests studied appeared ineffective for predicting success in the dental assistants, data processing and industrial electronics programs.

II. RECOMMENDATIONS

The writer recommends that:

1. The same study be conducted on a continuing basis as more students successfully complete the programs allowing for larger norm groups.
2. Follow-up research be done using a different criteria for success. For example, include the students who drop out early to accept employment in the area for which they had been taking training.
3. Follow-up research be done using other factors as variables, e.g., high school grade-point-average or the IBM Programmers Aptitude Test (PAT) (for data processing students).
4. Follow-up research be done using other subtests of the GATB for some programs, e.g., subtests F (Finger Dexterity), M (Manual Dexterity), and K (Motor Coordination) for the dental assistants program.

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